

AMENDMENTS TO THE SPECIFICATION

Replace Abstract, Page 28, Lines 1-28

"The present invention relates to an airbag cushion, which simultaneously exhibits a very low amount of fabric utilized to produce the target airbag cushion in correlation to an overall high amount of available inflation airspace within the cushion itself. These two correlative elements are now combined for the first time in what is defined as an effective fabric usage index (being the quotient of the amount of fabric utilized in the ~~construction~~ construction of the airbag cushion and the available inflation airspace volume). The inventive airbag cushion must possess an effective fabric usage factor of at most 0.0330. A cushion exhibiting such low seam usage and fabric usage factors and also comprising an integrated looped pocket for the disposition of an inflator can is also provided as well as an overall vehicle restraint system comprising the inventive airbag cushion."

Replace Paragraph beginning Page 1, Lines 13-22

"The present invention relates to an airbag cushion which simultaneously exhibits a very low amount of fabric utilized to produce the target airbag cushion in correlation to an overall high amount of available inflation airspace within the cushion itself. These two correlative elements are now combined for the first time in what is defined as an effective fabric usage index (being the quotient of the amount of fabric utilized in the ~~construction~~ construction of the airbag cushion and the available inflation airspace volume). The inventive airbag cushion must possess an effective fabric usage factor of at most 0.0330. A cushion exhibiting such low seam usage and fabric usage factors and also comprising an integrated looped pocket for the disposition of an inflator can is also provided as well as an overall vehicle restraint system comprising the inventive airbag cushion."

Replace Paragraph on Page 2, Line 2

"All U.S. ~~patent~~ patents cited herein are hereby fully incorporated by reference."

Replace Paragraph beginning Page 2, Lines 3-12

"Inflatable protective cushions used in passenger vehicles are a component of relatively complex passive restraint systems. The main elements ~~of these~~ of these systems are: an impact sensing system, an ignition system, a propellant material, an attachment device, a system enclosure, and an inflatable protective cushion. Upon sensing an impact, the propellant is ignited causing an explosive release of gases ~~filling~~ filling the cushion to a deployed state which can absorb the impact of the forward movement of a body and dissipate its energy by means of rapid venting of the gas. The entire sequence of events occurs within about 30 milliseconds. In the undeployed state, the cushion is stored in or near the steering column, the dashboard, in a door, or in the back of a front seat placing the cushion in close proximity to the person or object it is to protect."

Replace Paragraph beginning Page 4, Line 15 to Page 5, Line 7

"As will be appreciated, an important consideration in cutting panel structures from a base material is the ability to maximize the number of panels which can be cut from a fixed area through close-packed nesting of the panels. It has been found that minimizing the number of different geometries making up panels in the cushion and using geometries with substantially straight line perimeter configurations generally permits an enhanced number of panels to be cut from the base material. The use of panels having generally straight line profiles has the added benefit of permitting the panels to be attached to one another using substantially straight seams or be substantially formed during the weaving process using a jacquard or dobby loom. Such a straight seam configuration provides a more cost-effective method of producing such airbags. The term "seam" denotes any manner or method of connecting separate fabric panels or separate portions of a single fabric panel. Thus, sewing (with thread, for example), welding (with ultrasonic stitching, for example), or weaving panels or portions together (with a jacquard or dobby loom, ~~for example~~ example), and the like, may be employed for this purpose."

Replace Paragraph beginning Page 5, Line 8 – Page 6, Line 14

"However, even with the utilization of substantially straight seams to produce airbags cushions, a problem still resides in the need for labor-intensive ~~cutting~~ cutting and sewing operations for large-scale manufacture. Furthermore, since the costs of producing airbag fabrics are relatively high and there is a general need to reduce such costs, there is a consequent need to more efficiently make use of the fabric by lowering the amount which needs to be cut (cutting operations also translate into higher labor costs), reducing the amount of fabric used in order to provide substantially lower packing volumes (in order to reduce the size of the airbag modules in cars since available space on dashboards, doors, and the like, are at a premium within automobiles), and reducing the shipping weight of such products (which translates into lower shipping costs), as well as other highly desired reasons. However, it has been problematic to reduce such utilized fabric amounts in the past without consequently also reducing the available ~~infation~~ inflation airspace volume within the cushion product. There is a need then to reduce the amount of time to produce airbag cushions while simultaneously providing the lowest amount of fabric and simultaneously allow for a sufficient volume of air (gas) to inflate the target airbag cushion during an inflation event (herein described as "available inflation airspace"). Such a desired method and product has not been available, particularly for passenger-side airbags which, as noted previously require a greater amount of fabric for larger volumes of air (gas) to provide the greatest amount of protection area to a passenger. With greater amounts of fabric needed, generally this has translated into the need for longer seams to connect and attach fabric panels, which in turn translates into greater amounts of time needed for sewing, and the like, operations. Furthermore, there has not been any discussion within the prior art of the possibility of simultaneously reducing the amount of the required amount of utilized fabric while providing sufficient volumes of available inflation airspace within the target airbag cushion. Thus, a need exists to produce high available inflation airspace volume airbag cushions with a minimal

requirement in fabric utilization to manufacture the overall cushion product. As noted above, the prior art has not accorded any advancements or even discussions to this effect."

Replace Paragraph beginning Page 6, Line 17 – Page 7, Line 16

"In view of the foregoing, it is a general object of the present invention to provide a cost-effective, easy to manufacture airbag cushion for utilization within a vehicle restraint system. The term "vehicle restraint system" is intended to mean both inflatable occupant restraining cushion and the mechanical and chemical components (such as the ~~infation~~- inflation means, ignition means, propellant, and the ~~like~~ like). It is a more particular object of the present invention to provide a vehicle restraint system wherein the target airbag cushion preferably comprises very low amounts of fabric and comprises all substantially straight seams to attach its plurality of fabric components together (although as noted above, other configured seams may also be used as long the overall required effective seam usage factor is met). A further object of this invention is to provide an easy-to-assemble airbag cushion which is minimally labor-intensive to manufacture, requires much lower fabric costs due to a substantial reduction in the overall requirement of utilized fabric amounts, and which also comprises an integrated looped pocket for the disposition of an inflator can within the airbag cushion. It is still a further object of this invention to provide a vehicle restraint system comprising an airbag cushion which provides the maximum amount of available ~~infation~~- inflation airspace volume simultaneously with the lowest length of seam (or seams) and lowest amount of utilized fabric necessary to manufacture the cushion. Another object of the invention is to provide a method of making a low cost airbag cushion (due to low levels of labor required to sew the component parts together and reduced amount of fabric to manufacture and cut) of simple and structurally efficient design."

Replace Paragraph beginning Page 7, Line 17 - Page 8, Line 14

"To achieve these and other objects and in accordance with the purpose of the invention, as embodied and broadly described herein, the present invention provides an airbag cushion having at least one fabric component, wherein said airbag cushion possesses an effective fabric usage factor of less than about 0.0330. The effective fabric usage factor is derived from an effective fabric usage index which concerns (and is defined as) the quotient of the total amount of fabric utilized to manufacture the airbag cushion (measured in square meters) over the total volume of available inflation airspace within the airbag cushion (measured in liters). In order to exhibit a sufficiently low effective fabric usage factor, the amount of fabric must be very low with a correspondingly high available inflation airspace volume. Of course, this airspace volume will be the same for each factor since the measurements of both factors (seam usage and fabric usage) are made for the same bag. Such an airbag cushion may comprise at least two separate fabric panels or a single panel with portions which require connection (preferably through the utilization of at least one substantially straight seam). The inventive bag is able to provide high available ~~inflation~~ inflation airspace volumes due to the particular configurations of the used fabric panels or portions. The configurations permit more efficient utilization of fabric webs by cutting panels from the webs and producing less waste of unused fabric. The preferred embodiment is discussed in greater detail below."

Replace Paragraph beginning Page 9, Line 11 – Page 10, Line 1

"The present invention also provides an airbag cushion possessing the required effective fabric usage factor which also comprises a looped pocket for introduction of the inflator can of an inflator assembly. ~~In the~~ The most preferred embodiment includes two mirror-image body panel sections and two substantially straight seams along corresponding lateral boundary edges. Any boundary segments of the body panels which are not joined to one another are joined around the perimeter of a, preferably, rectilinear panel by a series of short, substantially straight seams. Such a configuration thereby forms a looped pocket in the airbag as well as an

overall inflatable cushion structure. The airbag itself need not be created from two mirror-image body panel sections as any configuration of fabric panels will function properly in this invention as long as a three-dimensional inflatable cushion is formed during an inflation event and a looped pocket is created in the airbag in which ~~the~~ at least the inflator can of an inflator assembly is disposed."

Replace Paragraph beginning Page 10, Lines 2-7

"Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice ~~for~~ of the invention. It is to be understood that both the foregoing general description and the following detailed description of preferred embodiments are exemplary and explanatory only, and are not to be viewed as in any way restricting the scope of the invention as set forth in the claims."

Replace Paragraph beginning Page 14, Lines 2-8

"Turning now to the drawings, wherein like elements are denoted by like reference numerals throughout the various views, in **FIG. 1** there is shown a fabric web **10**, wherein eight fabric panels to be cut **12, 14, 16, 18, 20, 22, 24,** and **26** have been outlined. Also, specific fabrics pieces to be removed and slits **28, 30, 32** within the two largest fabric panels **12, 14** are outlined as well. The fabric web ~~--10--~~ in this specific example comprised nylon 6,6, 630 denier yarns, woven on a jacquard loom into a fabric **10** comprising 41 picks by 41 ends per inch."

Replace Paragraph beginning Page 15, Lines 10-18

"**FIG. 9** shows a fully deployed inflatable restraint cushion **50** in opposing relation to an occupant **52** located on the front seat **54** of a vehicle **56** such as an automobile, airplane, and the like. As shown, the cushion **50** may be outwardly deployed from the dash panel **57** through

by an inflation means **58** from a position directly opposite the occupant **52**. It is to be understood, however, that the cushion **50** may likewise be deployed from any other desired location in the vehicle **56** including the steering wheel (not illustrated), the vehicle side panels (not illustrated), the floor (not illustrated), or the backrest of the front seat **54** for disposition in opposing relation to a rear passenger (not illustrated)."

Replace Paragraph beginning Page 16, Line 3

"In **FIG.11**, two smaller preferred fabric panels **116**, **118** have been connected to one preferred large fabric panel **112** by substantially straight seams **144**, **146**, **148**. The composite fabric structure now has two small fabric portions **131**, **150**, **152** uncovered by the two smaller fabric panels **116**, **118**. An imaginary straight line **142** denotes the future fold line within the fabric composite of the fabric panels **112**, **116**, **118**, which is noticeably off-center relative to the center of the mouth M, in order to ultimately allow for the bag to be deployed at an angle from a horizontally disposed dashboard (not illustrated).

Replace Paragraph beginning Page 16, Lines 10-14

"In **FIG. 12**, tie-rods **153**, **155** have been placed over the small fabric portions **150**, **152** which have been folded back over the tie-rods **153**, **155** as shown, folded again, as in **FIG. 13**, and connected to themselves by seams ~~152~~ **154**, **156**. The folded over fabric portions **150**, **152** provide reinforcement in order to withstand inflation pressures at the mouth opening of the cushion."

Replace Paragraph beginning Page 17, Lines 3-11

"**FIG. 18** shows a fully deployed inflatable restraint cushion **160** in opposing relation to an occupant **162** located on the front seat **164** of a vehicle **166** such as an automobile, airplane,

and the like. As shown, the cushion **160** may be outwardly deployed from the dash panel **167** ~~through~~ by an inflation means **168** from a position directly opposite the occupant **162**. It is to be understood, however, that the cushion **160** may likewise be deployed from any other desired location in the vehicle **166** including the steering wheel (not illustrated), the vehicle side panels (not illustrated), the floor (not illustrated), or the backrest of the front seat **164** for disposition in opposing relation to a rear passenger (not illustrated)."

Replace Paragraph beginning Page 18, Lines 1-10

"In **FIG. 21**, the fabric panel **212** has been folded over imaginary line **242** (in half) leaving one smaller fabric panel **216** in view (the other is not illustrated as it is now located on the bottom portion of fabric panel **212** directly beneath smaller fabric panel **218**). A seam **244** connects fabric panel **212** to itself and also connects the smaller fabric panels **216**, **218** both to the larger panel **212** and to themselves. Upon unfolding of the connected composite, the non-connected ends of the panel **212** will form the same shape as the front panel **224** of **FIG. 22**. **FIG. 23** then shows the seam **252** needed to sew the non-connected ends of the large panel **212** (of **FIG. 21**), and **FIG. 24** provides a top view of a finished cushion **246** **260 and showing a looped pocket 250 for an inflation means** and **FIG. 25** provides a side view of a finished cushion **260** after all the connection through seams **234**, **244**, **248** have been made."

Replace Paragraph beginning Page 18, Lines 11-19

"**FIG. 26** shows a fully deployed inflatable restraint cushion **260** in opposing relation to an occupant **262** located on the front seat **264** of a vehicle **266** such as an automobile, airplane, and the like. As shown, the cushion **260** may be outwardly deployed from the dash panel **267** ~~through~~ by an inflation means **268** from a position directly opposite the occupant **262**. It is to be

understood, however, that the cushion **260** may likewise be deployed from any other desired location in the vehicle **266** including the steering wheel (not illustrated), the vehicle side panels (not illustrated), the floor (not illustrated), or the backrest of the front seat **264** for disposition in opposing relation to a rear passenger (not illustrated)."

Replace Paragraph under table beginning Page 21, Lines 23-25

"The 414T and CF bags listed above are tilted cushions for use in conjunction with relatively horizontal dashboards. The others are used in ~~conjunction~~ conjunction with substantially vertically configured dashboards."

Replace Paragraph beginning Page 21, Line 26 - Page 22, Line 9

"Generally, a an airbag module manufacturer or automobile manufacturer will specify what dimensions and performance characteristics are needed for a specific model and make of car. Thus, airbag inflation airspace volume, front panel protection area (particularly for passenger-side airbag cushions), and sufficient overall protection for a passenger are such required specifications. In comparison with those commercially available airbag cushions listed above, the inventive airbag cushions which meet the same specifications (and actually exceed the overall passenger protection ~~characteristics~~ characteristics versus the prior art cushions) but require less fabric, less seam length for sewing operations, and thus cost appreciably less than those competitive cushions. The dimensions and seam usage factors for the inventive bags (which compare with those in Table 1, above, directly, and as noted) are presented below in tabular form:"